Appendix 1. Laboratory reporting levels for major ions and nutrients analyzed in water samples collected from Breckenridge Reservoir, Virginia, September 2008 through August 2009.

[Reporting limits are in milligrams per liter, except as noted]

Constituent name	Method reporting limit	Constituent name	Method reporting limit
Calcium, dissolved	0.044	Organic carbon, dissolved	0 .4
Chloride, dissolved	0.02	pH, standard units	0.1
Escherichia coliform (*E. coli*), colonies per 100 milliliter sample	1	Phosphorus, dissolved	0.006
Fluoride, dissolved	0.02	Phosphorus, phosphate, ortho, dissolved	0.008
Magnesium, dissolved	0.016	Phosphorus, total	0.008
Nitrogen, ammonia, dissolved	0.02	Potassium, dissolved	0.008
Nitrogen, nitrite, dissolved	0.002	Silica, dissolved	0.058
Nitrogen, nitrite plus nitrate, dissolved	0.016	Sodium, dissolved	0.10
Nitrogen, total, dissolved	0.10	Specific conductance, microsiemens per centimeter at 25 degrees Celsius	1
Nitrogen, total	0.10	Sulfate, dissolved	0 .02
Organic carbon, total	0.6		

Appendix 2. Laboratory reporting levels for pesticides analyzed in water samples collected from Breckenridge Reservoir, Virginia, September 2008 through August 2009.

[Reporting levels are in micrograms per liter]

Constituent name	Method reporting level	Constituent name	Method reporting level
2,6-Diethylaniline	0.006	Fonofos	0.0044
2-Chloro-4-isopropylamino-6-amino-s-triazine	0.014	Lindane	0.0040
alpha-HCH-d6	percentage	Linuron	0.06
alpha-HCH	0.004	Malathion	0.016
Acetochlor	0.010	Metolachlor	0.014
Alachlor	0.008	Metribuzin	0.012
Atrazine	0.007	Molinate	0.0026
Azinphos-methyl	0.12	Napropamide	0.008
Benfluralin	0.014	p,p'-DDE	0.0020
Butylate	0.004	Parathion	0.02
Carbaryl	0.06	Parathion-methyl	0.008
Carbofuran	0.060	Pebulate	0.016
Chlorpyrifos	0.010	Pendimethalin	0.012
cis-Permethrin	0.014	Phorate	0.02
Cyanazine	0.022	Prometon	0.012
Dacthal	0.0076	Propyzamide	0.0036
Desulfinylfipronil amide	0.029	Propachlor	0.006
Diazinon	0.005	Propanil	0.010
Diazinon-d10	percentage	Propargite	0.020
Dieldrin	0.009	Simazine	0.006
Disulfoton	0.04	Tebuthiuron	0.028
EPTC	0.0020	Terbacil	0.024
Ethalfluralin	0.006	Terbufos	0.018
Ethoprophos	0.016	Thiobencarb	0.016
Fipronil	0.018	Tri-allate	0.006
Fipronil sulfide	0.013	Trifluralin	0.018
Fipronil sulfone	0 .024		

Appendix 3. Summary of physical properties at various depths for Brecknridge Reservoir above dam near Joplin, Virginia (0166030), and cross-section profiling points.

[Profiling points shown in figure 1, site 1. ft, feet; °C, degrees Celsius; mg/L, milligrams per liter; µs/cm, microseimens per centimeter at 25°C; units, standard pH units; FNU, formazin nephelometric units; A-1 and A-2, cross-section profiling points; <, actual value likely less than published value]

Sample date	Depth (ft)	Water temperature (°C)			Dissolved oxygen (mg/L)			Specific conductance (µs/cm)			pH (units)			Turbidity (FNU)		
		01660030	A-1	A-2	01660030	A-1	A-2	01660030	A-1	A-2	01660030	A-1	A-2	01660030	A-1	A-2
Apr-09	1	11.6	11.4	11.8	9.1	9.2	9.1	49	49	49	6.0	6.0	6.1	4.8	4.8	4.6
Apr-09	2	11.4	11.4	11.6	9.2	9.1	9.1	49	49	49	6.1	6.0	6.1	5.1	4.8	4.7
Apr-09	4	11.4	11.4	11.5	9.2	9.1	9.1	49	49	49	6.1	6.0	6.1	5.0	5.1	4.8
Apr-09	6	11.4	11.4	11.4	9.2	9.1	9.1	49	49	49	6.1	6.0	6.1	4.9	5.1	4.9
Apr-09	8	11.4	11.4	11.4	9.2	9.1	9.1	49	49	49	6.1	6.0	6.1	5.1	5.1	4.8
Apr-09	10	11.4	11.4	11.4	9.2	9.1	9.1	49	49	49	6.0	6.0	6.0	5.2	5.4	5.1
Apr-09	12	11.3	11.4	11.3	9.2	9.2	9.1	49	49	49	6.0	6.0	6.0	5.3	5.5	5.4
Apr-09	14	11.3	11.4	11.3	9.2	9.2	9.2	49	49	49	6.0	6.0	6.0	5.6	8.4	5.7
Apr-09	16	11.3	11.4	11.3	9.2	9.9	9.2	49	49	49	5.9	6.1	6.0	5.9	7.5	6.0
Apr-09	18	11.2		11.2	9.2		9.2	49		49	6.0		6.0	6.5		6.3
Apr-09	20	11.1		11.3	9.3		9.7	49		49	6.0		6.0	6.6		7.3
Apr-09	22	11.1			9.3			49			6.0			6.3		
Apr-09	24	11.0			9.4			49			6.0			6.9		
Apr-09	26	10.8			9.5			49			6.0			6.8		
Apr-09	28	10.6			9.6			49			6.1			7.2		
Apr-09	30	10.5			9.7			49			6.2			8.1		
Apr-09	32	10.5			10.6			49			6.7			<24.6		
May-09	1	15.8	15.9	15.9	8.3	8.3	8.4	49	49	49	7.0	6.8	6.7			
May-09	2	15.6	15.5	15.6	8.3	8.4	8.4	49	49	49	7.0	6.8	6.7			
May-09	4	15.4	15.1	15.2	8.4	8.5	8.6	49	49	49	7.0	6.8	6.7			
May-09	6	14.9	14.9	14.8	8.5	8.5	8.7	47	47	47	7.1	6.8	6.7			
May-09	8	14.8	14.8	14.8	8.6	8.6	8.7	47	47	46	7.1	6.8	6.8			
May-09	10	14.7	14.7	14.8	8.7	8.7	8.7	46	47	46	7.1	6.9	6.7			
May-09	12	14.6	14.6	14.7	8.7	8.7	8.7	46	46	46	7.1	6.8	6.4	**NO MAY TURBIDITY VALUES**		
May-09	14	14.5	14.5	14.7	8.8	8.8	8.7	45	45	46	7.1	6.9	6.3			
May-09	16	14.4	14.4		8.9	8.8		45	45		7.1	6.8				
May-09	18	14.3	14.3		8.9	8.8		45	44		7.1	6.7				
May-09	20	14.1	14.2		9.0	8.8		44	44		6.9	6.5				
May-09	22	14.0	14.1		9.0	8.9		43	43		6.7	6.4				
May-09	24	13.9	14.0		9.0	8.9		42	42		6.6	6.3				
May-09	26	13.9			9.5			42			6.6					
Jun-09	1	23.8	23.7	24.6	7.8	8.1	9.0	94	94	94	7.0	6.9	7.1	8.5	8.2	7.7
Jun-09	2	23.6	22.9	24.4	7.9	6.9	8.4	94	94	94	6.9	6.7	7.0	8.5	9.1	7.9
Jun-09	4	22.7	22.6	22.3	6.4	6.1	6.0	95	94	95	6.6	6.6	6.6	9.3	9.8	9.9
Jun-09	6	22.2	22.1	22.2	5.7	5.6	5.8	95	95	95	6.5	6.5	6.5	10.4	10.4	10.6
Jun-09	8	22.1	22.1	22.1	5.6	5.3	5.8	95	95	95	6.5	6.5	6.5	10.4	10.4	10.3
Jun-09	10	22.0	21.9	22.1	5.4	5.1	5.7	95	95	95	6.5	6.5	6.5	10.4	10.2	10.3
Jun-09	12	22.0	21.9	22.0	5.1	5.0	5.6	95	95	95	6.5	6.5	6.5	10.2	10.0	10.2
Jun-09	14	21.8	21.8	22.0	4.7	4.7	5.5	95	95	95	6.4	6.4	6.5	9.9	9.7	10.2
Jun-09	16	21.6	21.6	22.0	4.5	4.3	6.2	95	95	95	6.4	6.4	6.6	10.0	10.3	9.2
Jun-09	18	21.5	21.5		4.3	4.3		95	95		6.4	6.4		11.3	11.6	
Jun-09	20	21.4	21.4		4.3	4.3		95	95		6.4	6.4		12.3	12.1	
Jun-09	22	21.3	21.3		4.2	4.3		95	95		6.4	6.4		13.9	12.2	
Jun-09	24	21.2	21.1		4.2	4.3		96	96		6.4	6.4		15.4	18.1	
Jun-09	26	21.1	21.0		4.2	4.3		96	97		6.4	6.4		16.9	18.1	
Jun-09	28	20.9	21.0		4.1	5.0		98	97		6.4	6.5		20.6	16.9	
Jun-09	30	20.9			4.3			99			6.4			19.1		

Appendix 3. Summary of physical properties at various depths for Breckenridge Reservoir above dam near Joplin, Virginia (0166030), and cross-section profiling points. —Continued

[Profiling points shown in figure 1, site 1. ft, feet; °C, degrees Celsius; mg/L, milligrams per liter; µs/cm, microseimens per centimeter at 25°C; units, standard pH units; FNU, formazin nephelometric units; A-1 and A-2, cross-section profiling points; <, actual value likely less than published value]

Sample date	Depth (ft)	Water temperature (°C)			Dissolved oxygen (mg/L)			Specific conductance (µs/cm)			pH (units)			Turbidity (FNU)		
		01660030	A-1	A-2	01660030	A-1	A-2	01660030	A-1	A-2	01660030	A-1	A-2	01660030	A-1	A-2
Jul-09	1	24.8	24.8	24.7	4.9	4.8	4.8	55	55	55	6.6	6.6	6.6	3.7	3.6	3.8
Jul-09	3	24.6	24.4	24.6	4.7	4.4	4.8	55	55	55	6.6	6.6	6.6	3.8	4.1	3.8
Jul-09	5	24.3	24.2	24.2	4.4	4.2	4.4	55	55	55	6.6	6.5	6.6	4.2	4.3	4.3
Jul-09	7	24.1	24.2	24.1	4.0	4.0	4.3	55	55	55	6.5	6.5	6.5	4.9	4.7	4.7
Jul-09	9	24.1	24.1	24.1	4.0	4.0	4.3	55	55	55	6.5	6.5	6.5	4.9	5.4	5.0
Jul-09	11	24.0	24.0	24.1	4.0	4.0	4.3	55	55	55	6.5	6.5	6.5	4.9	6.8	5.9
Jul-09	13	24.0	23.9	24.0	3.9	4.0	4.3	55	55	55	6.5	6.5	6.5	5.0	6.3	10.3
Jul-09	15	23.9	23.9	24.0	3.7	4.0	4.3	55	55	55	6.5	6.5	6.5	5.1	5.6	14.2
Jul-09	17	23.8	23.9	24.0	3.6	4.0	5.1	55	55	55	6.5	6.5	6.6	5.3	5.8	12.8
Jul-09	19	23.8	23.9		3.6	4.3		55	55		6.5	6.6		5.3	8.4	
Jul-09	21	23.7			3.4			55			6.5			6.4		
Jul-09	23	23.6			3.3			55			6.5			7.3		
Jul-09	25	23.6			3.2			55			6.5			9.5		
Jul-09	27	23.5			3.1			55			6.5			13.8		
Jul-09	29	23.2			2.8			56			6.5			19.2		
Jul-09	31	23.1			2.8			58			6.5			<28.4		
Aug-09	1	26.7	26.8	26.9	5.1	4.9	4.8	53	53	53	6.6	6.6	6.6	5.7	5.1	5.3
Aug-09	3	26.7	26.8	26.8	5.1	4.8	4.8	53	53	53	6.6	6.6	6.6	5.9	5.1	5.4
Aug-09	5	26.7	26.7	26.7	5.1	4.8	4.8	53	53	53	6.6	6.6	6.6	5.9	5.5	6.3
Aug-09	7	26.7	26.7	26.7	5.0	4.7	4.8	53	53	53	6.6	6.6	6.6	6.1	5.7	6.3
Aug-09	9	26.7	26.7	26.7	5.0	4.7	4.8	53	53	53	6.6	6.6	6.6	6.2	6.3	7.7
Aug-09	11	26.6	26.7	26.7	5.0	4.7	5.1	53	53	53	6.6	6.6	6.6	6.3	7.6	15.7
Aug-09	13	26.6	26.7	26.7	4.9	4.8	5.3	53	53	53	6.6	6.6	6.7	6.3	9.7	13.9
Aug-09	15	26.6	26.7		4.9	5.1		53	53		6.6	6.7		6.4	14.0	
Aug-09	17	26.6			4.3			53			6.6			7.5		
Aug-09	19	26.5			4.3			53			6.6			7.5		
Aug-09	21	26.5			4.3			53			6.6			7.5		
Aug-09	23	26.5			4.0			53			6.5			7.8		
Aug-09	25	26.3			3.6			53			6.5			8.4		
Aug-09	27	26.1			3.5			53			6.5			9.4		
Aug-09	29	26.1			3.4			53			6.5			13.1		
Aug-09	31	26.0			3.2			54			6.5			10.3		

Appendix 4. Summary of physical properties at various depths for Breckenridge Reservoir below South Branch Chopawamsic Creek near Joplin, Virginia (01660020), and cross-section profiling points.

[Profiling points shown in figure 1, site 2. ft, feet; °C, degrees Celsius; mg/L, milligrams per liter; µs/cm, microseimens per centimeter at 25°C; units, standard pH units; FNU, formazin nephelometric units; A-1 and A-2, cross-section profiling points; <, actual value likely less than published value]

Sample date	Depth (ft)	Water temperature (°C)			Dissolved oxygen (mg/L)			Specific conductance (µs/cm)			pH (units)			Turbidity (FNU)		
		01660020	B-1	B-2	01660020	B-1	B-2	01660020	B-1	B-2	01660020	B-1	B-2	01660020	B-1	B-2
Feb-09	1	4.7	4.6	4.6	9.4	9.4	9.4	50	50	50	8.1	8.1	8.1	3.4	3.4	3.6
Feb-09	3	4.7	4.7	4.6	9.3	9.3	9.4	50	50	50	8.1	8.1	8.1	3.6	3.6	3.7
Feb-09	5	4.7	4.7	4.6	9.3	9.3	9.4	50	50	50	8.1	8.1	8.1	3.6	3.5	3.6
Feb-09	7	4.7	4.7	4.7	9.3	9.3	9.4	50	51	50	8.1	8.1	8.1	3.6	3.6	3.3
Feb-09	9	4.7	4.7	4.6	9.3	9.3	9.4	50	50	50	8.1	8.1	8.1	3.6	5.1	3.7
Feb-09	11	4.7		4.6	9.3		9.4	50		50	8.1		8.1	3.6		3.7
Feb-09	13	4.7		4.6	9.3		9.4	50		50	8.1		8.1	3.6		3.9
Feb-09	15	4.7		4.6	9.2		9.4	51		51	8.1		8.1	3.7		5.0
Feb-09	17	4.7		4.6	9.2		9.4	51		51	8.1		8.1	3.7		5.4
Feb-09	19	4.7		4.6	9.2		10.0	51		50	8.1		8.1	3.8		5.7
Feb-09	21	4.6			9.2			51			8.1			4.0		
Feb-09	23	4.6			9.1			51			8.1			4.3		
Feb-09	25	4.6			9.4			51			8.2			<12.6		
Mar-09	1	9.4	9.3	9.5	8.8	8.7	8.3	51	51	51	8.5	8.5	8.4	3.8	3.6	3.8
Mar-09	2	9.3	9.2	9.1	8.8	8.7	8.5	51	51	51	8.5	8.5	8.5	3.8	3.6	3.8
Mar-09	4	9.1	9.1	9.0	8.8	8.7	8.5	51	51	51	8.5	8.5	8.5	3.9	3.7	3.8
Mar-09	6	9.0	8.9	9.0	8.7	8.6	8.5	51	51	51	8.5	8.5	8.5	4.0	3.9	4.0
Mar-09	8	8.9	8.9	8.9	8.6	8.6	8.4	51	51	51	8.5	8.6	8.5	4.0	4.0	3.9
Mar-09	10	8.8	8.9	8.7	8.4	8.7	8.4	51	51	51	8.5	8.6	8.5	7.1	10.1	4.1
Mar-09	12	8.7		8.6	8.4		8.3	51		51	8.5		8.5	7.1		4.7
Mar-09	14	8.6		8.5	8.5		8.2	51		51	8.5		8.5	6.9		6.8
Mar-09	16	8.6		8.5	8.4		8.2	51		51	8.5		8.6	9.9		11.6
Mar-09	18	8.5		8.5	8.3		8.4	51		51	8.6		8.6	10.4		12.0
Mar-09	20	8.4			8.2			51			8.6			6.0		
Mar-09	22	8.3			8.0			52			8.6			5.5		
Mar-09	24	8.2			8.3			51			8.6			7.1		
Apr-09	1	11.9	12.0	11.7	9.1	9.1	9.0	49	49	49	6.4	6.3	6.2	4.7	4.6	4.8
Apr-09	2	11.9	12.0	11.5	9.1	9.1	9.0	49	49	49	6.4	6.3	6.2	4.6	4.8	4.7
Apr-09	4	11.7	11.6	11.4	9.0	9.1	9.0	49	49	49	6.4	6.4	6.2	4.9	5.3	4.7
Apr-09	6	11.4	11.4	11.4	9.1	9.2	9.0	49	49	49	6.5	6.4	6.2	5.2	6.3	4.5
Apr-09	8	11.4	11.4	11.4	9.1	9.2	9.0	49	49	49	6.4	6.4	6.3	5.1	8.6	4.6
Apr-09	10	11.4	11.4	11.3	9.2	9.8	9.0	49	49	49	6.4	6.5	6.3	4.8	6.3	4.6
Apr-09	12	11.4		11.3	9.2		9.0	49		49	6.3		6.3	4.8		4.9
Apr-09	14	11.4		11.3	9.2		9.1	49		49	6.3		6.3	5.0		4.9
Apr-09	16	11.3		11.3	9.2		9.2	49		49	6.3		6.4	5.5		5.5
Apr-09	18	11.0		11.3	9.4		9.6	49		49	6.4		6.4	6.5		6.4
Apr-09	20	10.0			9.7			50			6.6			7.6		
Apr-09	22	10.1			10.8			50			6.9			7.9		
May-09	1	15.7	15.9	15.7	8.4	8.4	8.4	49	49	49	6.7	6.6	6.6			
May-09	2	15.4	15.3	15.4	8.4	8.5	8.5	49	49	49	6.7	6.6	6.6			
May-09	4	15.1	15.0	15.2	8.5	8.6	8.6	48	47	48	6.7	6.6	6.6			
May-09	6	15.0	14.9	15.0	8.6	8.6	8.6	48	47	48	6.7	6.6	6.6			
May-09	8	14.9	14.8	14.8	8.7	8.7	8.8	47	47	47	6.7	6.5	6.6			
May-09	10	14.7	14.7	14.7	8.8	8.8	8.8	46	46	46	6.7	6.3	6.5	**NO MAY TURBIDITY VALUES**		
May-09	12	14.6	14.6	14.6	8.9	8.8	8.8	46	45	46	6.7	6.1	6.3			
May-09	14	14.5	14.6	14.6	9.0	9.2	8.8	45	45	47	6.6	6.0	6.1			
May-09	16	14.3		14.5	9.2		9.1	46		47	6.4		6.2			
May-09	18	13.8			9.5			43			6.3					
May-09	20	13.5			9.6			41			6.1					
May-09	22	13.5			10.4			41			6.1					

Appendix 4. Summary of physical properties at various depths for Breckenridge Reservoir below South Branch Chopawamsic Creek near Joplin, Virginia (01660020), and cross-section profiling points.—Continued

[Profiling points shown in figure 1, site 2. ft, feet; °C, degrees Celsius; mg/L, milligrams per liter; µs/cm, microseimens per centimeter at 25°C; units, standard pH units; FNU, formazin nephelometric units; A-1 and A-2, cross-section profiling points; <, actual value likely less than published value]

Sample date	Depth (ft)	Water temperature (°C)			Dissolved oxygen (mg/L)			Specific conductance (µs/cm)			pH (units)			Turbidity (FNU)		
		01660020	B-1	B-2	01660020	B-1	B-2	01660020	B-1	B-2	01660020	B-1	B-2	01660020	B-1	B-2
Jun-09	1	24.0	23.4	23.6	8.3	8.2	8.1	94	94	96	6.9	6.9	6.9	8.9	9.7	8.7
Jun-09	2	22.9	22.8	22.7	7.0	6.6	6.5	94	94	95	6.8	6.7	6.6	10.6	9.6	9.5
Jun-09	4	22.5	22.3	22.3	5.9	5.8	5.7	95	95	94	6.6	6.5	6.5	9.9	9.1	9.6
Jun-09	6	22.2	22.1	22.1	5.4	5.6	5.3	95	95	95	6.5	6.5	6.5	9.6	9.0	9.5
Jun-09	8	22.0	22.0	22.0	5.0	5.7	5.1	95	95	95	6.5	6.5	6.5	9.7	9.1	10.2
Jun-09	10	21.8	22.1	21.9	4.7	6.6	4.8	94	95	95	6.4	6.7	6.4	10.3	7.6	10.6
Jun-09	12	21.7		21.8	4.5		4.6	95		95	6.4		6.4	11.8		11.2
Jun-09	14	21.6		21.7	4.4		4.6	95		95	6.4		6.4	12.7		11.6
Jun-09	16	21.6		21.7	4.3		5.5	95		95	6.4		6.5	14.5		18.9
Jun-09	18	21.5			4.2			95			6.4			18.2		
Jun-09	20	21.3			4.2			95			6.4			18.1		
Jun-09	22	21.3			4.5			98			6.4			19.2		
Jul-09	1	24.9	25.1	24.9	5.0	5.1	5.0	54	54	54	6.6	6.6	6.6	3.7	3.5	3.6
Jul-09	2	24.8	24.8	24.7	4.9	4.7	4.7	54	54	54	6.6	6.6	6.6	3.6	3.7	3.7
Jul-09	4	24.7	24.4	24.5	4.6	4.1	4.2	54	55	55	6.6	6.5	6.5	3.8	4.1	4.0
Jul-09	6	24.3	24.2	24.2	4.1	4.1	4.1	55	55	55	6.5	6.5	6.5	4.8	4.2	4.3
Jul-09	8	24.2	24.1	24.1	4.1	3.9	4.0	55	55	55	6.5	6.5	6.5	5.7	4.8	4.2
Jul-09	10	24.0	24.1	24.0	3.8	3.9	4.0	54	54	54	6.5	6.5	6.5	4.3	4.8	4.2
Jul-09	12	23.9	23.9	23.9	3.8	3.9	3.9	54	54	54	6.5	6.5	6.5	4.7	5.2	4.4
Jul-09	14	23.8	23.9	23.9	3.8	3.9	4.0	54	54	54	6.5	6.5	6.5	5.2	5.8	5.0
Jul-09	16	23.8	23.9	23.9	3.9	4.4	5.0	54	54	54	6.5	6.6	6.5	6.4	18.2	30.0
Jul-09	18	23.7			4.0			54			6.5			8.6		
Jul-09	20	23.4			4.5			55			6.5			12.3		
Jul-09	22	23.2			4.8			57			6.6			17.2		
Jul-09	24	23.0			4.9			56			6.6			22.7		
Aug-09	1	27.2	27.0	27.2	4.9	4.9	4.7	53	53	53	6.6	6.6	6.6	4.3	4.7	4.3
Aug-09	3	26.9	26.9	27.0	4.7	4.8	4.7	53	53	53	6.6	6.6	6.6	4.7	4.9	4.3
Aug-09	5	26.8	26.8	26.8	4.7	4.8	4.5	53	53	53	6.6	6.6	6.6	4.8	4.7	4.9
Aug-09	7	26.8	26.8	26.7	4.8	4.8	4.6	53	53	53	6.6	6.6	6.6	4.7	4.5	5.0
Aug-09	9	26.7	26.7	26.7	4.8	4.9	4.6	53	53	53	6.6	6.6	6.6	4.6	4.3	5.4
Aug-09	11	26.7	26.7	26.7	4.8	4.8	4.7	53	53	53	6.6	6.6	6.6	4.4	5.0	6.7
Aug-09	13	26.7	26.7	26.7	4.6	4.9	4.8	53	53	53	6.6	6.7	6.6	4.6	5.8	10.0
Aug-09	15	26.7	26.7	26.8	4.3	5.2	5.6	53	53	53	6.6	6.7	6.7	5.2	21.2	18.9
Aug-09	17	26.7			3.7			53			6.6			6.5		
Aug-09	19	26.6			3.6			54			6.5			8.2		
Aug-09	21	26.5			3.4			54			6.5			12.4		
Aug-09	23	26.4			4.2			55			6.5			<22.5		

Appendix 4. Summary of physical properties at various depths for Breckenridge Reservoir below South Branch Chopawamsic Creek near Joplin, Virginia (01660020), and cross-section profiling points.—Continued

[Profiling points shown in figure 1, site 2. ft, feet; °C, degrees Celsius; mg/L, milligrams per liter; µs/cm, microseimens per centimeter at 25°C; units, standard pH units; FNU, formazin nephelometric units; A-1 and A-2, cross-section profiling points; <, actual value likely less than published value]

Sample date	Depth (ft)	Water temperature (°C)			Dissolved oxygen (mg/L)			Specific conductance (µs/cm)			pH (units)			Turbidity (FNU)		
		01660020	B-1	B-2	01660020	B-1	B-2	01660020	B-1	B-2	01660020	B-1	B-2	01660020	B-1	B-2
Sep-08	1	21.1	21.1	21.1	3.9	4.0	4.0	37	37	37	5.9	5.8	6.0	2.7	2.6	2.7
Sep-08	2	21.0	21.0	21.1	4.0	4.0	4.0	37	37	37	5.9	5.8	5.9	2.7	2.6	2.6
Sep-08	4	21.0	21.0	21.0	4.0	4.0	3.9	37	37	37	5.9	5.7	5.9	2.7	2.8	2.6
Sep-08	6	21.0	21.0	21.0	4.0	4.0	3.9	37	37	37	5.9	5.7	5.9	2.6	3.1	2.7
Sep-08	8	21.0	21.0	21.0	4.0	4.0	3.9	37	37	37	5.9	5.7	5.9	2.5	2.8	2.7
Sep-08	10	21.0	21.0	21.0	4.0	4.6	3.9	37	37	37	5.9	5.7	5.9	2.6		2.8
Sep-08	12	21.0		21.0	4.0		3.9	37		37	5.8		5.8	2.7		3.3
Sep-08	14	21.0		21.0	4.0		3.9	37		37	5.8		5.8	2.6		3.3
Sep-08	16	21.0		20.9	4.1		3.9	37		37	5.8		5.7	2.7		3.4
Sep-08	18	21.0		20.9	4.2		4.0	37		37	5.8		5.7	2.8		3.1
Sep-08	20	20.9			4.5			37			5.7			3.3		
Sep-08	22	20.7			4.8			37			5.7			2.9		
Oct-08	1	18.8	19.0	18.9	6.4	6.2	6.0	40	40	40	6.4	6.4	6.4	1.9	1.6	1.8
Oct-08	2	18.6	18.6	18.7	5.8	5.9	5.8	40	40	40	6.4	6.4	6.4	1.9	1.9	2.1
Oct-08	4	18.3	18.2	18.4	5.7	5.6	5.5	40	40	40	6.4	6.4	6.4	2.4	2.4	2.2
Oct-08	6	18.1	18.1	18.1	5.8	5.7	5.4	40	40	40	6.4	6.4	6.3	2.4	2.4	2.3
Oct-08	8	18.1	18.1	18.1	5.7	5.7	5.4	40	40	40	6.4	6.4	6.4	2.5	2.4	2.3
Oct-08	10	18.1	18.1	18.1	5.6	5.6	5.5	40	40	40	6.4	6.4	6.4	2.6	2.5	2.3
Oct-08	12	18.0	18.0	18.0	5.6	5.5	5.6	40	40	40	6.4	6.4	6.4	2.6	2.4	2.3
Oct-08	14	18.0	18.0	18.0	5.6	5.6	5.7	40	40	40	6.4	6.4	6.4	3.2	2.2	2.4
Oct-08	16	18.0	18.0	18.0	5.7	5.6	5.9	40	40	40	6.4	6.4	6.4	5.7	3.1	2.8
Oct-08	18	17.9		18.0	5.7		6.1	40		40	6.4		6.4	8.3		4.7
Oct-08	20	17.8			6.1			41			6.4			7.7		
Oct-08	22	17.8			6.1			41			6.5			3.8		
Nov-08	1	9.5	9.5	9.5	7.4	7.3	7.4	44	44	44	7.5	7.5	7.6	3.3	3.3	3.2
Nov-08	3	9.5	9.5	9.5	7.4	7.3	7.4	44	44	44	7.5	7.6	7.6	3.4	3.3	3.2
Nov-08	5	9.5	9.5	9.5	7.4	7.3	7.4	44	44	44	7.5	7.5	7.6	3.4	3.4	3.4
Nov-08	7	9.5	9.5	9.5	7.4	7.3	7.3	44	44	44	7.5	7.5	7.6	3.4	3.5	3.3
Nov-08	9	9.5	9.5	9.5	7.4	7.4	7.3	44	44	44	7.5	7.6	7.6	3.4	3.4	3.5
Nov-08	11	9.4	9.5	9.4	7.4	7.4	7.4	44	44	44	7.5	7.6	7.6	3.5	3.5	3.7
Nov-08	13	9.4	9.4	9.3	7.4	7.4	7.4	44	44	44	7.5	7.6	7.6	3.5	3.7	4.0
Nov-08	15	9.1	9.4	9.2	7.7	7.5	7.4	44	44	44	7.5	7.6	7.6	3.6	3.8	4.6
Nov-08	17	8.7	9.3	9.1	7.8	7.5	7.4	44	44	44	7.5	7.6	7.6	3.9	4.1	4.8
Nov-08	19	8.3		9.0	8.0		7.4	44		44	7.6		7.6	4.0		6.6
Nov-08	21	7.7		9.1	8.1		7.4	44		44	7.6		7.5	4.2		8.4
Nov-08	23	7.5			8.0			45			7.6			10.5		
Dec-08	1	5.9	5.9	5.9	8.6	8.7	8.8	44	44	43	7.6	7.6	7.6	11.4	10.4	10.3
Dec-08	3	5.8	5.8	5.9	8.7	8.7	8.8	44	44	43	7.6	7.5	7.6	11.4	10.6	10.0
Dec-08	5	5.8	5.6	5.9	8.6	8.7	8.6	44	44	43	7.6	7.5	7.6	11.2	10.1	10.1
Dec-08	7	5.7	5.5	5.8	8.6	8.6	8.6	44	44	44	7.6	7.5	7.6	10.4	9.6	10.1
Dec-08	9	5.5	5.4	5.6	8.6	8.6	8.7	44	44	44	7.6	7.5	7.6	9.6	11.2	10.1
Dec-08	11	5.4	5.4	5.5	8.6	8.6	8.6	44	44	44	7.6	7.5	7.6	9.3	10.3	9.9
Dec-08	13	5.4	5.3	5.6	8.6	8.6	8.7	44	44	44	7.6	7.6	7.6	9.5	10.3	18.5
Dec-08	15	5.3	5.3		8.5	8.6		44	44		7.6	7.6		10.6	10.3	
Dec-08	17	5.3	5.3		8.5	8.5		44	44		7.6	7.6		12.5	16.1	
Dec-08	19	5.2			8.4			44			7.6			14.4		
Dec-08	21	5.2			8.4			44			7.6			15.5		
Dec-08	23	5.2			8.4			43			7.6			14.8		
Dec-08	25	5.2			8.6			44			7.6			14.3		

Appendix 5. Summary of physical properties at various depths for Breckenridge Reservoir above South Branch Chopawamsic Creek near Joplin, Virginia (01659700), and cross-section profiling points.

[Profiling points shown in figure 1, site 3. ft, feet; °C, degrees Celsius; mg/L, milligrams per liter; µs/cm, microseimens per centimeter at 25°C; units, standard pH units; FNU, formazin nephelometric units; A-1 and A-2, cross-section profiling points; <, actual value likely less than published value]

Sample date	Depth (ft)	Water temperature (°C)			Dissolved oxygen (mg/L)			Specific conductance (µs/cm)			pH (units)			Turbidity (FNU)		
		01659700	C-1	C-2	01659700	C-1	C-2	01659700	C-1	C-2	01659700	C-1	C-2	01659700	C-1	C-2
Apr-09	1	11.9	12.1	11.6	9.1	8.8	9.1	49	49	49	6.4	6.4	6.3	4.9	5.1	5.0
Apr-09	2	11.6	12.0	11.5	9.1	8.7	9.1	49	49	49	6.5	6.3	6.3	4.7	4.8	5.0
Apr-09	3	11.6	12.0	11.2	9.1	8.3	9.2	49	49	49	6.5	6.3	6.3	4.8	4.9	5.2
Apr-09	4	11.4	11.8	11.2	9.3	7.9	9.2	49	49	49	6.4	6.4	6.4	4.9	5.2	6.1
Apr-09	5	11.2	11.1	11.1	9.5	7.6	9.3	49	49	49	6.3	6.4	6.5	5.1	5.3	5.1
Apr-09	6	10.8	11.0	11.1	9.8	6.9	10.0	49	49	49	6.4	6.4	6.5	5.8	5.3	5.5
Apr-09	7	10.1	10.9		10.2	7.0		48	49		6.4	6.5		6.9	5.2	
Apr-09	8	9.1	10.9		10.6	9.8		47	49		6.6	6.6		8.1	8.1	
Apr-09	9	9.0			10.7			45			6.6			7.6		
Apr-09	10	9.1			11.7			45			7.0			7.4		
May-09	1	15.9	16.0	15.9	8.4	8.5	8.5	49	48	48	6.5	6.5	6.5	NO MAY TURBIDITY VALUES		
May-09	2	15.7	15.6	15.6	8.5	8.4	8.4	48	48	48	6.6	6.5	6.4			
May-09	3	15.4	15.4	15.4	8.6	8.4	8.5	48	48	47	6.6	6.5	6.3			
May-09	4	15.3	15.3	15.4	8.7	8.5	8.6	47	48	47	6.5	6.5	6.0			
May-09	5	15.2	15.2	15.3	8.8	8.6	9.3	46	47	47	6.4	6.5	6.0			
May-09	6	15.1	15.1		8.9	8.8		46	47		6.3	6.4				
May-09	7	15.0	14.9		9.0	8.9		45	46		6.1	6.3				
May-09	8	14.9	14.7		9.8	9.0		45	45		6.0	6.1				
May-09	9		14.8			9.3			45			5.9				
Jun-09	1	24.1	24.2	23.7	8.4	8.1	8.5	93	93	93	6.8	6.8	6.8	7.3	7.7	8.1
Jun-09	2	23.6	23.4	23.6	8.1	8.1	8.4	94	94	93	6.8	6.8	6.8	7.7	8.4	9.2
Jun-09	3	22.9	22.9	23.0	7.9	7.7	8.0	94	94	94	6.7	6.7	6.8	8.1	11.1	13.0
Jun-09	4	22.7	22.6	22.7	7.9	7.3	7.8	94	94	93	6.7	6.7	6.7	7.9	7.9	19.9
Jun-09	5	22.5	22.3	22.7	7.5	6.7	7.9	94	93	93	6.7	6.6	6.8	8.0	8.2	<61.7
Jun-09	6	22.3	22.3		6.8	6.5		94	93		6.6	6.6		8.8	8.3	
Jun-09	7	22.2	22.2		6.4	6.3		93	93		6.6	6.6		10.7	8.4	
Jun-09	8	22.2	22.2		6.3	6.3		93	93		6.6	6.6		16.1	8.4	
Jun-09	9	22.1	22.3		6.7	7.2		93	94		6.6	6.7		16.6	7.5	
Jul-09	1	25.1	24.9	25.8	5.1	4.9	5.8	54	54	55	6.6	6.6	6.7	4.3	3.6	3.8
Jul-09	2	24.9	24.6	24.9	5.0	4.7	5.6	54	54	53	6.6	6.6	6.6	5.3	3.6	3.9
Jul-09	3	24.7		24.7	4.9		5.6	54		53	6.6		6.6	7.3		4.8
Jul-09	4	24.5	24.4	24.6	4.8	4.4	5.6	54	54	53	6.6	6.6	6.6	4.5	3.9	7.0
Jul-09	5	24.4		24.7	4.4		6.4	54		53	6.5		6.7	4.0		<42.0
Jul-09	6	24.3	24.2		4.4	4.6		54	54		6.5	6.5		4.2	4.5	
Jul-09	7	24.2			4.4			54			6.5			4.9		
Jul-09	8	24.2	24.0		4.4	5.1		54	54		6.5	6.5		5.5	6.2	
Jul-09	9	24.2			4.5			54			6.5			6.6		
Jul-09	10		23.7			5.2			53			6.6			10.2	
Jul-09	12		23.7			5.4			54			6.6			11.9	
Aug-09	1	27.2	27.2	27.7	5.8	6.0	6.7	53	53	53	6.7	6.7	6.8	3.4	3.1	9.9
Aug-09	2	26.9		27.0	5.8		6.3	53		53	6.7		6.8	4.1		6.5
Aug-09	3		27.0	27.0		6.0	6.2		53	53		6.7	6.8		3.0	8.4
Aug-09	4	26.9		26.9	5.8		6.1	53		53	6.7		6.8	3.5		11.3
Aug-09	5		26.8	26.9		5.9	6.0		53	53		6.7	6.8		2.9	7.8
Aug-09	6	26.8		26.8	5.9		5.9	53		53	6.7		6.8	3.2		9.2
Aug-09	7		26.7	26.8		5.9	6.0		53	53		6.7	6.8		3.3	10.1
Aug-09	8	26.6		26.7	6.4		6.9	52		52	6.8		6.9	8.3		<47.3
Aug-09	9		26.5			5.8			53			6.7			3.9	
Aug-09	10	26.6			6.9			52			6.8			16.3		
Aug-09	11		26.1			5.7			53			6.7			4.9	
Aug-09	13		26.2			6.1			52			6.8			6.5	

Appendix 5. Summary of physical properties at various depths for Breckenridge Reservoir above South Branch Chopawamsic Creek near Joplin, Virginia (01659700), and cross-section profiling points.—Continued

[Profiling points shown in figure 1, site 3. ft, feet; °C, degrees Celsius; mg/L, milligrams per liter; µs/cm, microseimens per centimeter at 25°C; units, standard pH units; FNU, formazin nephelometric units; A-1 and A-2, cross-section profiling points; <, actual value likely less than published value]

Sample date	Depth (ft)	Water temperature (°C)			Dissolved oxygen (mg/L)			Specific conductance (µs/cm)			pH (units)			Turbidity (FNU)		
		01659700	C-1	C-2	01659700	C-1	C-2	01659700	C-1	C-2	01659700	C-1	C-2	01659700	C-1	C-2
Sep-08	1	21.2	21.2	21.0	3.9	4.0	3.4	37	36	37	5.8	5.7	5.7	3.0	2.9	6.6
Sep-08	2	21.0	21.1	20.9	3.9	4.0	3.3	37	36	37	5.8	5.8	5.7	3.3	3.1	14.4
Sep-08	3	20.9		20.8	3.9		3.2	37		37	5.8		5.7	3.7		25.3
Sep-08	4	20.8	20.9	20.8	3.9	4.1	3.0	37	37	38	5.7	5.7	5.7	5.1	3.3	11.5
Sep-08	5	20.7		20.8	4.0		2.9	37		38	5.7		5.7	8.0		5.7
Sep-08	6	20.7	20.8	20.8	4.0	4.3	2.9	38	37	37	5.7	5.7	5.6	7.1	3.2	4.6
Sep-08	7	20.7		20.7	4.1		2.9	38		38	5.6		5.6	10.4		5.8
Sep-08	8	20.7	20.7			4.7		37	37		5.8	5.6			3.2	
Sep-08	9															
Sep-08	10		20.7			4.0			36			5.8				
Oct-08	1	18.4	18.5	18.6	5.6	5.7	5.6	40	40	40	6.4	6.4	6.3	2.0	2.1	2.5
Oct-08	2	18.3	18.3	18.3	5.5	5.6	5.5	40	40	40	6.4	6.4	6.3	2.6	2.4	2.5
Oct-08	3	18.2	18.2	18.3	5.4	5.5	5.4	40	40	40	6.4	6.4	6.3	3.4	2.3	2.3
Oct-08	4	18.2	18.2	18.2	5.4	5.3	5.2	40	40	40	6.4	6.3	6.3	3.0	2.3	2.3
Oct-08	5	18.2	18.1	18.2	5.3	5.3	5.1	40	40	40	6.4	6.4	6.3	3.1	2.3	2.9
Oct-08	6	18.1	18.1	18.1	5.3	5.4	4.9	40	40	40	6.4	6.3	6.3	2.8	2.4	5.1
Oct-08	7	18.1	18.1	18.1	5.4	5.5	4.7	40	40	40	6.4	6.4	6.3	2.6	2.7	5.9
Oct-08	8		18.0	18.1		5.7	4.5		40	40		6.4	6.3		2.6	9.3
Oct-08	9		17.3			6.0			42			6.4			2.0	
Oct-08	10		17.2			5.8			43			6.4			4.1	
Nov-08	1	8.8	8.8	8.8	7.6	7.6	7.4	44	44	44	7.6	7.6	7.6	3.9	3.1	3.1
Nov-08	2	8.8	8.8	8.8	7.6	7.6	7.4	44	44	44	7.6	7.6	7.6	4.4	3.1	3.2
Nov-08	3	8.8	8.8	8.8	7.5	7.7	7.4	44	44	44	7.6	7.6	7.6	5.5	3.2	3.7
Nov-08	4	8.8	8.8	8.7	7.6	7.7	7.4	44	44	44	7.6	7.6	7.6	4.1	3.2	5.7
Nov-08	5	8.8	8.8	8.7	7.6	7.7	7.4	44	44	44	7.6	7.6	7.6	4.6	3.2	11.5
Nov-08	6	8.8	8.8	8.7	7.6	7.7	7.4	44	44	44	7.6	7.6	7.6	6.1	3.2	33.4
Nov-08	7	8.8	8.7	8.7	7.6	7.8	7.9	44	44	44	7.6	7.6	7.6	4.4	3.3	45.1
Nov-08	8	8.8	8.7		7.6	7.9		44	44		7.7	7.6		4.0	3.4	
Nov-08	9		8.5			9.1			44			7.7			6.7	
Dec-08	1	6.1	6.1	6.1	8.6	8.4	8.6	44	44	44	7.6	7.5	7.6	9.4	10.7	8.6
Dec-08	2	6.1	6.1	6.1	8.6	8.4	8.6	44	44	44	7.6	7.5	7.6	9.4	10.7	8.8
Dec-08	3	6.1	6.0	6.1	8.6	8.4	8.6	44	44	44	7.6	7.5	7.6	9.2	10.7	8.7
Dec-08	4	6.1	6.0	6.1	8.6	8.4	8.6	44	44	44	7.6	7.5	7.6	8.8	11.0	8.8
Dec-08	5	6.1	6.0	6.1	8.6	8.4	8.6	44	44	44	7.6	7.5	7.6	9.3	11.3	9.2
Dec-08	6	6.1	6.0	6.1	8.6	8.3	8.6	44	44	44	7.6	7.5	7.6	9.4	12.2	9.7
Dec-08	7	6.1	5.9	6.2	8.6	8.3	8.6	44	44	44	7.6	7.5	7.5	9.7	12.9	14.8
Dec-08	8	6.1	5.9		8.6	8.3		44	44		7.6	7.5		16.4	13.9	
Dec-08	9		5.9			8.3			44			7.5			14.4	
Dec-08	10		5.9			8.4			44			7.5			17.2	
Feb-09	1	3.6	3.8	3.2	9.9	9.9	10.1	48	48	48	8.2	8.2	8.2	3.8	3.6	3.1
Feb-09	2	3.7	3.7	3.2	9.9	9.9	10.1	49	48	48	8.2	8.2	8.2	3.7	3.6	3.1
Feb-09	3	3.8	3.7	3.3	9.9	9.9	10.1	48	48	48	8.2	8.2	8.2	3.8	3.7	6.5
Feb-09	4	3.8	3.7	3.4	9.9	9.9	9.9	49	48	48	8.2	8.2	8.2	3.9	3.7	4.0
Feb-09	5	3.7	3.7		9.9	9.9		49	49		8.3	8.2		3.8	3.7	
Feb-09	6	3.6	3.7		9.9	9.9		49	48		8.3	8.2		3.7	3.7	
Feb-09	7	3.7	3.8		9.9	9.9		49	48		8.3	8.1		5.3	3.7	
Feb-09	8		3.6			9.9			48			8.2			3.5	
Mar-09	1	8.7	8.5	8.8	9.0	9.0	8.9	50	50	51	8.6	8.5	8.4	4.8	4.8	4.5
Mar-09	2	8.6	8.5	8.5	9.0	9.0	8.8	50	50	50	8.6	8.5	8.4	4.8	5.0	4.9
Mar-09	3	8.5	8.4	8.4	9.0	9.0	8.8	50	50	50	8.6	8.5	8.4	4.8	5.1	4.9
Mar-09	4	8.2	8.4	8.1	9.0	9.0	8.9	50	50	50	8.7	8.5	8.5	5.1	5.5	5.3
Mar-09	5	8.0	8.3	7.8	9.0	9.0	8.9	50	50	50	8.7	8.5	8.5	5.3	6.5	6.8
Mar-09	6	8.0	7.9	7.7	9.0	9.0	8.9	50	50	50	8.7	8.5	8.5	5.2	7.5	7.7
Mar-09	7	8.0	7.5	7.7	9.1	9.1	9.3	50	50	50	8.7	8.6	8.5	5.4	5.9	9.6
Mar-09	8		7.4			9.4			50			8.6			5.9	

Appendix 6. Summary of various constituents at 1-foot depth at sampling sites in Breckenridge Reservoir, Virginia.

[FNU, formazin nephelometric units; mg/L, milligrams per liter; *E. coli* , Escherichia coliform bacteria; col/100mL, colonies per 100 milliliters; $CaCO_3$, calcium carbonate; –, no sample collected]

Constituent	Breckenridge Reservoir above Dam near Joplin, Virginia (site 1, 01660030)											
	Sept. 2008	Oct. 2008	Nov. 2008	Dec. 2008	Jan. 2009	Feb. 2009	Mar. 2009	Apr. 2009	May 2009	June 2009	July 2009	Aug. 2009
Turbidity, in FNU	3.0	5.8	3.4	10.3	—	3.4	3.7	4.8	—	8.5	3.7	5.7
Secchi -disk depth, in feet	4.5	4.8	4.5	3.0	—	5.8	—	4.6	4.0	3.5	5.8	4.1
E. coli , in col/100 mL	4	4	2	82	—	4	1	13	120	24	3	25
Alkalinity, in mg/L as $CaCO_3$	7	9	10	8	—	12	13	12	12	13	14	14

Constituent	Breckenridge Reservoir below South Branch Chopawamsic Creek near Joplin, Virginia (site 2, 01660020)											
	Sept. 2008	Oct. 2008	Nov. 2008	Dec. 2008	Jan. 2009	Feb. 2009	Mar. 2009	Apr. 2009	May 2009	June 2009	July 2009	Aug. 2009
Turbidity, in FNU	2.7	1.9	3.3	11.4	—	3.4	3.8	4.7	—	8.9	3.7	4.3
Secchi -disk depth, in feet	4.5	4.6	5.5	2.8	—	5.8	—	5.0	3.8	3.2	5.5	4.9
E. coli , in col/100 mL	7	10	3	96	—	2	2	11	77	9	1	15
Alkalinity, in mg/L as $CaCO_3$	7	11	10	9	—	12	13	12	12	12	14	14

Constituent	Breckenridge Reservoir above South Branch Chopawamsic Creek near Joplin, Virginia (site 3, 01659700)											
	Sept. 2008	Oct. 2008	Nov. 2008	Dec. 2008	Jan. 2009	Feb. 2009	Mar. 2009	Apr. 2009	May 2009	June 2009	July 20009	Aug. 2009
Turbidity, in FNU	3.0	2.0	3.9	9.4	—	3.8	4.8	4.9	—	7.3	4.3	3.4
Secchi -disk depth, in feet	4.6	5.2	4.5	3.0	—	5.8	—	5.0	3.8	3.3	5.3	4.7
E. coli , in col/100 mL	2	4	1	68	—	3	1	4	130	7	2	5
Alkalinity, in mg/L as $CaCO_3$	4	10	11	9	—	12	13	12	12	12	14	15

Appendix 7. Summary of nutrient concentrations at 1-foot depth at sampling sites in Breckenridge Reservoir, Virginia.

[Concentrations in milligrams per liter; E, estimated concentration; <, less than; —, no data]

Constituent	Breckenridge Reservoir above Dam near Joplin, Virginia (site 1, 01660030)											
	Sept. 2008	Oct. 2008	Nov. 2008	Dec. 2008	Jan. 2009	Feb. 2009	Mar. 2009	Apr. 2009	May 2009	June 2009	July 2009	Aug. 2009
Dissolved nitrite-nitrogen	0.001 E	0.002 E	0.002 E	0.002 E	—	0.001 E	<0.002	<0.002	0.001 E	0.002 E	0.002	<0.002
Dissolved nitrate-plus-nitrite	0.011 E	0.032	0.032	0.043	—	0.028	0.014 E	0.016	0.016	<0.016	<0.016	0.014 E
Dissolved ammonia-nitrogen	0.07	0.06	0.05	0.02 E	—	0.02 E	0.02 E	0.03	0.04	<0.02	0.08	0.06
Total dissolved nitrogen	0.42	0.44	0.30	0.31	—	0.30	0.26	0.25	0.31	0.36	0.46	0.37
Total nitrogen	0.54	0.35	0.28	0.33	—	0.16	0.18	0.24	0.29	0.52	0.50	0.36
Dissolved orthophosphorus	0.004 E	0.004 E	<0.008	0.004 E	—	0.005 E	<0.008	0.005 E	0.005 E	0.007 E	0.006 E	<0.008
Total dissolved phosphorus	0.007	0.010	0.009	0.008	—	0.005 E	0.005 E	0.008	0.007	0.015	0.014	0.010
Total phosphorus	0.024	0.017	0.015	0.028	—	0.013	0.013	0.017	0.019	0.041	0.025	0.021
Dissolved organic carbon	9.0	6.4	4.8	4.9	—	2.6	2.4	4.0	4.6	6.8	5.6	4.1
Total organic carbon	9.8	7.2	5.2	5.1	—	3.0	2.5	5.4	4.6	8.5 E	6.1	5.3

Constituent	Breckenridge Reservoir below South Branch Chopawamsic Creek near Joplin, Virginia (site 2, 01660020)											
	Sept. 2008	Oct. 2008	Nov. 2008	Dec. 2008	Jan. 2009	Feb. 2009	Mar. 2009	Apr. 2009	May 2009	June 2009	July 2009	Aug. 2009
Dissolved nitrite-nitrogen	0.001 E	0.002 E	0.002 E	0.002 E	—	0.001 E	0.001 E	0.001 E	0.001 E	0.002	0.002	<0.002
Dissolved nitrate-plus-nitrite	0.011 E	0.033	0.034	0.041	—	0.025	0.013 E	0.016	0.017	<0.016	0.008 E	0.011 E
Dissolved ammonia-nitrogen	0.07	0.05	0.04	0.01 E	—	0.01 E	0.02 E	0.03	0.03	<0.02	0.06	0.05
Total dissolved nitrogen	0.41	0.41	0.42	0.53	—	1.27	0.21	0.42	0.50	0.37	0.66	0.36
Total nitrogen	0.47	0.38	0.31	0.35	—	0.15	0.13	0.22	0.31	0.54	0.41	0.34
Dissolved orthophosphorus	0.005 E	0.004 E	<0.008	<0.008	—	<0.008	0.004 E	<0.008	<0.008	0.007 E	0.004 E	<0.008
Total dissolved phosphorus	0.010	0.011	0.007	0.008	—	0.006 E	0.006	0.009	0.008	0.016	0.013	0.011
Total phosphorus	0.022	0.019	0.015	0.027	—	0.014	0.014	0.017	0.021	0.041	0.027	0.020
Dissolved organic carbon	8.9	6.3	4.8	5.1	—	2.5	2.5	3.7	4.7	6.9	5.7	4.0
Total organic carbon	8.4	7.6	4.8	6.0	—	2.7	2.8	4.3	5.2	8.5	6.2	5.3

Constituent	Breckenridge Reservoir above South Branch Chopawamsic Creek near Joplin, Virginia (site 3, 01659700)											
	Sept. 2008	Oct. 2008	Nov. 2008	Dec. 2008	Jan. 2009	Feb. 2009	Mar. 2009	Apr. 2009	May 2009	June 2009	July 2009	Aug. 2009
Dissolved nitrite-nitrogen	0.001 E	0.002 E	0.002 E	0.001 E	—	<0.002	<0.002	0.001 E	0.001 E	0.002	0.002 E	<0.002
Dissolved nitrate-plus-nitrite	0.010 E	0.034	0.032	0.017	—	0.011 E	0.008 E	0.014 E	0.015 E	<0.016	0.010 E	<0.016
Dissolved ammonia-nitrogen	0.06	0.05	0.04	0.02 E	—	0.01 E	0.02	0.03	0.03	<0.02	0.06	0.03
Total dissolved nitrogen	0.48	0.57	0.28	0.47	—	1.60	0.26	0.32	0.49	0.32	0.67	0.38
Total nitrogen	0.54	0.41	0.32	0.25	—	0.11	0.16	0.24	0.30	0.37	0.42	0.33
Dissolved orthophosphorus	0.004 E	<0.008	<0.008	<0.008	—	0.004 E	<0.008	0.005 E	<0.008	0.007 E	0.004 E	<0.008
Total dissolved phosphorus	0.008	0.012	0.008	0.013	—	0.005	0.007	0.008	0.007	0.014	0.013	0.010
Total phosphorus	0.028	0.027	0.020	0.024	—	0.013	0.015	0.017	0.020	0.028	0.027	0.021
Dissolved organic carbon	9.7	6.2	4.9	4.5	—	2.1	2.5	3.7	4.8	6.5	5.8	4.2
Total organic carbon	9.5	7.5	5.7	5.2	—	2.3	2.6	4.5	5.5	6.5	6.2	5.1

Appendix 8. Summary of dissolved major-ion concentrations at 1-foot depth at sampling sites in Breckenridge Reservoir, Virginia.

[Concentrations in milligrams per liter; <, less than; —, no data]

Constituent	Breckenridge Reservoir above Dam near Joplin, Virginia (site 1, 01660030)											
	Sept. 2008	Oct. 2008	Nov. 2008	Dec. 2008	Jan. 2009	Feb. 2009	Mar. 2009	Apr. 2009	May 2009	June 2009	July 2009	Aug. 2009
Calcium, dissolved	2.26	2.40	2.43	2.32	—	2.67	2.69	2.77	2.70	2.98	3.09	3.05
Magnesium, dissolved	1.11	1.20	1.32	1.28	—	1.50	1.50	1.50	1.54	1.58	1.67	1.56
Potassium, dissolved	1.44	1.44	1.76	1.51	—	1.04	1.00	1.01	1.11	1.16	1.14	1.00
Sodium, dissolved	1.94	2.47	2.91	3.08	—	4.25	4.22	3.99	3.62	3.02	3.22	3.12
Chloride, dissolved	1.93	2.40	2.95	3.15	—	4.32	4.43	4.16	3.71	2.82	3.02	2.97
Fluoride, dissolved	0.08	0.08	0.05	0.04	—	0.04	0.04	0.04	0.05	0.07	0.05	0.05
Sulfate, dissolved	3.04	2.84	2.79	3.71	—	3.82	3.40	3.86	3.86	3.35	2.71	2.46
Silica, dissolved	7.7	9.4	10.2	11.2	—	14.0	14.4	13.2	13.2	10.5	11.1	9.56

Constituent	Breckenridge Reservoir below South Branch Chopawamsic Creek near Joplin, Virginia (site 2, 01660020)											
	Sept. 2008	Oct. 2008	Nov. 2008	Dec. 2008	Jan. 2009	Feb. 2009	Mar. 2009	Apr. 2009	May 2009	June 2009	July 2009	Aug. 2009
Calcium, dissolved	2.24	2.38	2.36	2.24	—	2.58	2.65	2.79	2.71	2.96	3.05	3.08
Magnesium, dissolved	1.09	1.18	1.31	1.34	—	1.47	1.48	1.51	1.54	1.58	1.65	1.57
Potassium, dissolved	1.49	1.45	1.78	1.47	—	1.01	1.03	1.00	1.10	1.16	1.12	0.95
Sodium, dissolved	1.86	2.38	2.86	3.22	—	4.20	4.17	4.04	3.88	3.12	3.25	3.19
Chloride, dissolved	1.87	2.39	2.92	3.18	—	4.28	4.44	4.16	3.69	2.86	3.01	2.96
Fluoride, dissolved	0.08	0.09	0.04	0.04	—	0.04	0.04	0.04	0.06	0.07	0.05	0.05
Sulfate, dissolved	3.09	2.84	2.89	3.78	—	3.61	3.40	3.99	4.00	3.37	2.89	2.67
Silica, dissolved	7.53	9.24	10.1	11.9	—	13.8	14.3	13.3	13.1	10.7	10.8	9.51

Constituent	Breckenridge Reservoir above South Branch Chopawamsic Creek near Joplin, Virginia (site 3, 01659700)											
	Sept. 2008	Oct. 2008	Nov. 2008	Dec. 2008	Jan. 2009	Feb. 2009	Mar. 2009	Apr. 2009	May 2009	June 2009	July 2009	Aug. 2009
Calcium, dissolved	2.19	2.39	2.38	2.19	—	2.54	2.53	2.73	2.64	2.79	3.03	3.10
Magnesium, dissolved	1.08	1.20	1.31	1.31	—	1.45	1.43	1.49	1.52	1.53	1.63	1.59
Potassium, dissolved	1.49	1.45	1.77	1.31	—	0.92	0.97	0.98	1.10	1.13	1.12	0.90
Sodium, dissolved	1.81	2.39	2.84	3.34	—	4.12	4.06	4.04	3.82	3.00	3.19	3.21
Chloride, dissolved	1.76	2.38	2.92	3.34	—	3.74	4.30	4.12	3.65	2.80	3.02	2.97
Fluoride, dissolved	0.08	0.08	0.04	0.04	—	0.04	0.04	0.04	0.06	0.07	0.05	0.07
Sulfate, dissolved	3.08	2.82	2.82	3.84	—	2.85	3.32	3.95	3.97	3.17	2.91	2.33
Silica, dissolved	7.53	9.08	10.2	13.3	—	14.2	15.4	13.2	13.2	11.0	10.6	9.41

Appendix 9. Summary of water quality samples at North Branch Chopawamsic Creek near Independent Hill, Virginia.

[Units are in milligrams per liter, except where noted. —, no data; <, less than; E, estimated concentration]

Constituent	North Branch Chopawamsic Creek near Independent Hill, Virginia (01659000)											
	Sept. 2008	Oct. 2008	Nov. 2008	Dec. 2008	Jan. 2009	Feb. 2009	Mar. 2009	Apr. 2009	May 2009	June 2009	July 2009	Aug. 2009
Dissolved oxygen	9.3	7.2	9.4	9.0	—	9.6	11.2	13.6	10.4	6.6	7.2	6.6
pH (standard units)	6.5	6.3	7.9	7.6	—	7.3	7.7	6.5	6.0	6.5	6.5	6.3
Specific conductance (microsiemens at 25 degrees Celsius)	51	53	54	45	—	53	51	45	38	98	60	62
Water temperature (degrees Celsius)	16.7	16.3	4.4	7.5	—	2.2	3.5	9.6	12.8	19.7	19.0	20.0
Turbidity (formazin nephelometric units)	—	2.8	5.5	5.8	—	4.9	8.9	7.0	—	9.2	7.6	—
Dissolved calcium	—	—	2.78	—	—	2.81	2.53	—	1.96	—	—	3.04
Dissolved magnesium	—	—	1.77	—	—	1.75	1.68	—	1.40	—	—	1.67
Dissolved potassium	—	—	1.410	—	—	0.788	0.750	—	0.801	—	—	1.540
Dissolved sodium	—	—	4.12	—	—	4.85	—	—	3.10	—	—	4.13
Dissolved alkalinity, as $CaCO_3$	—	—	14	—	—	15	14	—	7	—	—	16
Dissolved chloride	—	—	3.84	—	—	3.87	5.30	—	2.82	—	—	5.45
Dissolved fluoride	—	—	0.05	—	—	0.04	0.04	—	0.07	—	—	0.05
Dissolved silica	—	—	17.3	—	—	18.1	15.9	—	13.3	—	—	12.3
Dissolved sulfate	—	—	2.48	—	—	2.73	3.10	—	4.34	—	—	1.79
Dissolved ammonia-nitrogen	<0.02	<0.02	<0.02	<0.02	—	<0.02	<0.02	<0.02	<0.02	0.02 E	<0.02	<0.02
Dissolved nitrate-plus-nitrite	<0.016	<0.016	<0.016	0.012 E	—	<0.016	<0.016	<0.016	0.012 E	0.058	0.044	0.017
Dissolved nitrite-nitrogen	<0.002	<0.002	0.001 E	0.001 E	—	0.001 E	<0.002	0.001 E	0.001 E	0.002	0.003	<0.002
Dissolved orthophosphorus	0.007	0.007 E	0.008 E	0.007 E	—	0.007 E	0.004	0.006 E	0.007 E	0.009	0.009	<0.008
Total dissolved phosphorus	0.008	0.005 E	0.013	0.011	—	0.006	0.007	0.009	0.012	0.020	0.013	0.013
Total phosphorus	0.015	0.015	0.018	0.020	—	0.013	0.033	0.019	0.026	0.040	0.020	0.022
Total dissolved nitrogen	0.14	0.12	0.17	0.30	—	0.27	0.40	0.40	0.46	0.61	0.28	0.27
Total nitrogen	0.10	0.11	0.14	0.21	—	0.11	0.11	0.27	0.34	0.41	0.20	0.22
Escherichia coliform (colonies per 100 milliliter)	240	99	23	17	—	7	20	12	56	—	77	330
Dissolved organic carbon	—	—	3.9	—	—	2.2	2.2	—	8.4	—	—	3.3
Total organic carbon	—	—	4.4	—	—	2.2	2.8	—	8.7	—	—	4.5
Suspended sediment	5	4	5	—	—	5	8	6	14	6	7	6

Appendix 10. Summary of water quality samples at Middle Branch Chopawamsic Creek near Garrisonville, Virginia.

[Units are in milligrams per liter, except where noted. —, no data; <, less than; E, estimated concentration]

Constituent	Middle Branch Chopawamsic Creek near Garrisonville, Virginia (01659500)				
	Nov. 2008	Feb. 2009	Mar. 2009	May 2009	Aug. 2009
Dissolved oxygen	10.7	10.5	10.9	10.5	8.5
pH (standard units)	7.9	7.5	6.2	6.1	6.9
Specific conductance (microsiemens at 25 degrees Celsius)	40	40	36	31	42
Water temperature (degrees Celsius)	4.0	2.3	3.8	13.0	21.0
Turbidity (formazin nephelometric units)	3.2	3.0	—	—	—
Dissolved calcium	1.86	1.94	1.74	1.77	2.07
Dissolved magnesium	1.17	1.16	1.11	1.23	1.18
Dissolved potassium	1.320	0.851	0.811	0.844	1.160
Dissolved sodium	3.13	3.40	3.18	2.51	2.71
Dissolved alkalinity, as $CaCO_3$)	10	—	10	7	12
Dissolved chloride	3.05	2.70	2.55	1.94	2.31
Dissolved fluoride	0.03	0.03	0.03	0.05	0.04
Dissolved silica	14.5	13.3	13.3	12.4	10.6
Dissolved sulfate	1.98	2.17	2.27	3.66	2.00
Dissolved ammonia-nitrogen	<0.02	<0.02	<0.02	<0.02	<0.02
Dissolved nitrate-plus-nitrite	<0.016	<0.016	<0.016	0.019	0.030
Dissolved nitrite-nitrogen	<0.002	<0.002	<0.002	0.001 E	<0.002
Dissolved orthophosphorus	0.006 E	0.006 E	0.007 E	0.006 E	<0.008
Total dissolved phosphorus	0.010	0.006 E	0.005 E	0.014	0.013
Total phosphorus	0.015	0.011	0.014	0.031	0.020
Total dissolved nitrogen	0.17	0.17	0.14	0.38	0.33
Total nitrogen	0.14	0.07 E	0.09 E	0.34	0.17
Escherichia coliform (colonies per 100 milliliter)	3	4	20	56	210
Dissolved organic carbon	3.0	2.0	2.0	7.1	3.8
Total organic carbon	3.2	1.9	2.4	7.2	—

Appendix 11. Summary of water quality samples at South Branch Chopawamsic Creek near Garrisonville, Virginia.

[Units are in milligrams per liter, except where noted. <, less than; —, no data]

Constituent	South Branch Chopawamsic Creek near Garrisonville, Virginia (01660000)				
	Nov. 2008	Feb. 2009	Mar. 2009	May 2009	Aug. 2009
Dissolved oxygen	10.9	9.8	11.3	10.3	7.8
pH (standard units)	7.8	7.5	5.9	6.5	6.7
Specific conductance (microsiemens at 25 degrees Celsius)	37	51	56	44	62
Water temperature (degrees Celsius)	5.2	2.6	4.2	12.9	21.2
Turbidity (formazin nephelometric units)	2.9	4.1	—	—	—
Dissolved calcium	1.78	2.62	2.35	2.33	3.29
Dissolved magnesium	1.06	1.44	1.32	1.27	1.69
Dissolved potassium	1.210	1.060	1.100	1.150	1.500
Dissolved sodium	2.47	4.89	5.79	3.92	3.85
Dissolved alkalinity, as $CaCO_3$	7	11	10	10	14
Dissolved chloride	2.70	5.74	8.25	4.41	5.99
Dissolved fluoride	0.04	0.04	0.03	0.07	0.05
Dissolved silica	7.80	12.4	11.4	11.7	9.96
Dissolved sulfate	3.52	2.51	3.22	3.94	2.54
Dissolved ammonia-nitrogen	0.02	0.01 E	<0.02	0.02 E	<0.02
Dissolved nitrate-plus-nitrite	0.088	0.114	0.089	0.058	0.223
Dissolved nitrite-nitrogen	0.002 E	0.001 E	<0.002	0.001 E	0.001 E
Dissolved orthophosphorus	0.005 E	0.007 E	0.008	0.008 E	0.004 E
Total dissolved phosphorus	0.010	0.007	0.007	0.013	0.009
Total phosphorus	0.013	0.013	0.019	0.030	0.016
Total dissolved nitrogen	0.34	0.35	0.28	0.40	0.45
Total nitrogen	0.34	0.19	0.21	0.34	0.38
Escherichia coliform (colonies per 100 milliliter)	11	20	7	92	100
Dissolved organic carbon	4.4	2.1	4.7	5.7	2.8
Total organic carbon	5.0	2.2	2.8	6.4	3.3